Comment on: Diverging Trends in National and Local Concentration

By Esteban Rossi-Hansberg, Pierre-Daniel Sarte, Nicholas Trachter

Jan Eeckhout*
UPF Barcelona†

Cambridge, MA, April 2, 2020

*I would like to thank Jan De Loecker and Shubhdeep Deb for discussions and comments. This research received financial support from the ERC, Advanced grant 339186, and from ECO2015-67655-P.

†jan.eeckhout@upf.edu – ICREA-GSE-CREi

There is a rapidly growing recent literature that analyzes the rise of market power over the last four decades in the United States and many other economies. The study of market power is of course not new and is arguably as old as the study of economics itself,[1] but the renewed interest is its scope, in particular the role for macroeconomics. Much of the recent literature is focussed on measuring market power economy wide, and on the macroeconomic implications market power has quantitatively. Many models of the macroeconomy, from monetary economics, over trade and urban economics, to labor have predictions that hinge on the degree of market power that firms have. The monetary transmission mechanism in the New Keynesian models for example crucially depends markups and the extent of to which the market power of firms is pervasive economy-wide. The challenge therefore is to find appropriate ways to measure market power for a representative sample, if not the universe of firms in the economy.

The paper by Esteban Rossi-Hansberg, Pierre Sarte and Nico Trachter draws the attention to an important and hitherto understudied issue in this literature, the dichotomy between national and local concentration. They main idea is that the degree of concentration of firms at the national level is very different than what it is at a local level, be it the state, the metropolitan area or the ZIP code. They find a baffling fact: all measures of local concentration show a declining trend, whereas measures of national concentration show an increasing trend.

This is an important observation and I sympathize a lot with the premise to investigate market power at different levels of aggregation and for different sub-economies of the macroeconomy. After all, to understand the macro economy we need to understand the micro origins. The paper also makes a noteworthy contribution in attempting to rationalize this dichotomy by investigating the role of superstar firms and firms with multiple establishments such as national chains in retail and Big Box stores. There is no doubt that the technological transformation of distribution and logistics has had a significant impact on concentration. The paper's main conclusion is that large national firms may exhibit market power at the national level, but they do so by inducing competition in local markets. The authors deduce that the increased competition in local markets is the result of more market power nationally. Therefore the rise of national market power is desirable.

Unfortunately the paper does not fully deliver on this ambitious research agenda. The reason why it fails to do so is of interest to the research community in macroeconomics that focuses the role of market power for the aggregate economy. The approach in this paper is instructive because it highlights the particular challenges that macroeconomic analysis faces once we take the micro origins with due consideration. The reason why the paper fails is because it has overlooked three decades of research in Industrial Organization (IO) that has repeatedly shown the shortcomings of the concentration measures on which the analysis here is based. Following the influential contribu-

[1] In historical times, enterprises such as the Dutch and the British East India Company were built on the premise of exclusive trading rights that effectively granted them monopoly power. And even in Ancient Greece writings there are mentions of monopoly power that derives from patents. More formally, as early as 200 years ago, Cournot (1838) derived a mathematical formulation of what is now known as the Cournot-Nash oligopoly equilibrium.

tion of Bresnahan (1989), the IO literature has moved away from concentration measures towards alternative approaches to measure market power. What this paper highlights is not simply that concentration measures are inadequate tools and that they have ignored the insights from the IO literature. This paper shows that in addition to the shortcomings in a traditional IO analysis, the challenges of a macro setting with diverse sectors and long time series completely incapacitates concentration measures as a tool in macro. This paper does provide a clear illustration where concentration measures go wrong.

In the remainder of this short comment I will provide some remarks that I hope will help guide the discussion for future research. I will illustrate the shortcomings of concentration measures when used in macro, I revisit the four main facts of the paper in the light of that discussion, and I propose some alternative methodology to think about market structure in the macro economy.

Concentration Measures

Market power is canonically defined as "the ability of a firm to profitably raise the market price of a good or service over marginal cost." This is typically expressed as the markup, the ratio of the price the firm charges over the marginal cost. As such, it is a statement about the behavior of an individual firm. Of course, what makes the measurement of market power conceptually a challenge is the fact that except in the case of a monopoly, the firm behavior is determined strategically and in equilibrium with the behavior of competitors in the market.

The problem that any researcher on market power faces is how to measure the marginal cost of a firm or of a product. An alternative is to focus on the measurement of profits instead, which includes not just the marginal cost but also overhead and fixed costs. Unfortunately, accounting profits are typically not equal to economic profits which raises an additional hurdle.

Therefore there is the alternative route to obtain *indirect* measures. To that effect and inspired by the one-to-one relationship between market power of a firm and its market share of revenue in a Cournot model, concentration measures inform us about the *distribution* of market power in a well determined market. The most popular of the concentration measures is the HerfindahlHirschman Index (HHI). It is defined as sum of squared market shares s_i of all firms i in a market: HHI $= \sum_i s_i^2 \in [0; 10,000]$. It is typically expressed as a number from 0 to 10,000 where the market share is expressed in percentages. The HHI is effectively a measure of inequality, just like the Gini coefficient or the variance. It turns a complex distribution of market shares with possibly infinite moments into a scalar that has an easy interpretation. Under monopoly (or a dominant firm with the entire market share), the market share is 100, which when squared, yields an HHI of 10,000. Under perfect competition with all market shares equal to zero, the HHI is zero. Its simplicity is part of the broad appeal of HHI, as are the readily available measures of revenue to calculate market shares.

There are however two long recognized shortcomings. First, the reliance on market shares as a measure of market power is not always suitable. There is indeed a direct positive relationship between markups and market share in the Cournot model, but in many models that relationship is not so direct and the HHI only imprecisely measures markups. What is even worse however, is that in some models the market share is *declining* in the markup (see for example Melitz and Ottaviano (2008) and Melitz (2003)). A higher HHI therefore indicates lower market power, not higher!

Second, the HHI crucially depends on the definition of a market: who are the competitors? If we wrongly determine the participants in the market, we get a wrong measure of the HHI and therefore the wrong measure of market power.

Are concentration measures a good tool to measure market power? Policy makers who review mergers at the Federal Trade Commission (FTC) and the Department of Justice (DoJ) still rely heavily on measures of concentration. The magic number there is 3,000, where merger review is automatically activated when the HHI in a market crosses this 3,000 watermark. It continues to be a transparent measure that is successful in convincing non-specialized judges ruling over merger cases.

However, following an influential article by Bresnahan (1989), the academic IO literature that studies market power seems to have veered towards a rejection of HHI. Instead, the literature has opted for a structural approach. The most celebrated is the demand approach pioneered by Berry et al. (1995) which specifies a model of consumer demand over goods with different degrees of subsititutability, of the market structure with well defined competitors, how they compete (quantity versus price competition for example) and with a specified production technology. This approach has been successful in determining market power in markets such as cars, breakfast cereal, cement, beer,... Because this so-called demand method is enormously demanding in terms of data requirements, in recent year the production approach has gained traction, especially because the data requirements are far less stringent thus lending itself better for the analysis of market power in macroeconomics with broad cross sections and long time series.[2]

Concentration Measures in Macro. So what are the prospects of concentration measures in macro? There is no doubt that the HHI is easy to calculate, that data on revenue is relatively widely available, and that this permits for data on broad cross sections and long time series. That is exactly what this paper exploits. The Achilles heel however is the market definition. What constitutes a market in the macro sense?

Here, macro faces even taller obstacles than IO. There are two sets of reasons for that, reasons based on the cross sectional comparison, and reasons based on the inter temporal comparison. The

[2]See Hall (1988) for the initial contribution proposing to use the firm's cost minimization decision to back out marginal cost and hence markups. While Hall (1988) use aggregate data, De Loecker and Warzynski (2012) and De Loecker et al. (2020) have used firm level data to calculate firm level markups and generate an economy wide distribution of markups.

fundamental problem is that the HHI is mechanically related to how a market is defined, typically the intersection of an industry classification and a geographical area. There are some six million firms and nearly seven million establishments in the United States. Each of them belongs to and industry (say SIC-8) and a geographical area (say ZIP code or MSA). It is precisely that ad hoc definition that does not correspond well to the true market definition, namely who competes with whom.

First, the cross sectional comparison. A typical SIC×Geo definition may be a close enough description of the true market, but it cannot be for all markets. For example, the ZIP code may be a more or less accurate description of a market for coffee shops or dry cleaners, but it is not for furniture retailers such as IKEA. For those companies, the MSA is the more accurate market definition. And for yet other manufacturers such as car assembly plants, the adequate market definition is national. The problem is that HHI is calculated for the same SIC×Geo definition for all firms, say either ZIP or MSA. Therefore either the SIC×Geo is not appropriate for furniture or car assembly (when ZIP; most car manufacturers in a ZIP code are monopolists and virtually all ZIP codes have zero car manufacturers) or it is not appropriate for coffee shops (when MSA). Inherently in the field of macro, there is never one size that fits all. If the set of sectors was reduced to tailor all industries to the same definition, it would be so product specific that it becomes IO and not macro.

But even at the ZIP level, the size of the size of these SIC×Geo definition is typically still too large for most products. The DoJ considers lack of competition starting at HHI larger than 3,000 or 3 similar firms. More than 10-15 firms is considered perfect competition in any model of oligopoly for any set of reasonable preferences. Some of these market definitions have more than 10,000 establishments. The national measures have millions. Rather than an HHI of thousands, those definitions whip up HHI's less in the decimals. This is very far away from the interpretation of what constitutes a market that exhibits limited competition. Using the SIC×Geo definition poses serious difficulties in the cross-sectional measurement of market power in macro, much more so than in IO.[3]

Second, the intertemporal comparisons. The ad hoc SIC×Geo definitions of what constitute a market are an even bigger challenge because those definition are fixed. In the presence of demographic changes, these fixed definitions induce a *mechanical change* in concentration measures such as HHI. As the number of establishments in these SIC×Geo cells changes for demographic reasons, so does the HHI.

For the purpose of understanding what drives the results in this paper, I show that four premises that are borne out in the data lead to the dichotomy of diverging concentration measures locally and nationally. The four premises are:

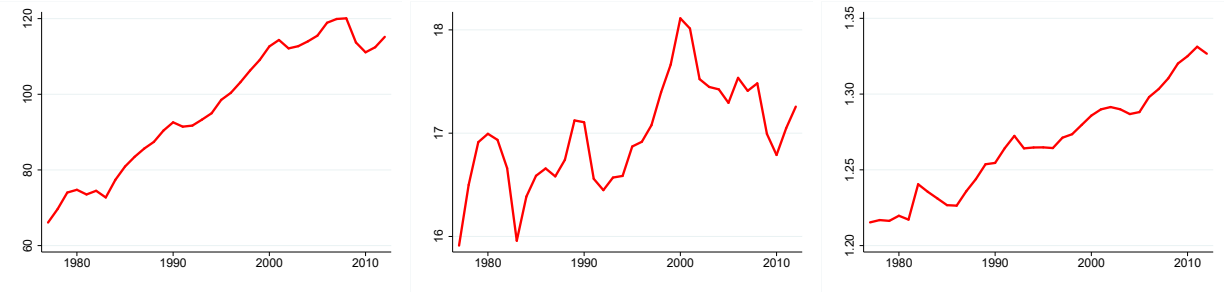
[3]Another well-known issue is the problem of missing data. Clearly, the HHI changes if observations are missing. This is a well-known issue that affects the NETS data in particular.

1. Population growth: Figure 1a shows that the employment population in the US has grown from around 70 million in the early 1980s to nearly 120 million now;

2. Constant average establishment size (Figure 1b): the average size of establishments in the US is fairly constant around 17 workers per establishment, hovering between 16 and 18 over the same period;

3. The ratio of establishments to firms has increased from 1.22 in 1980 to 1.33 most recently (Figure 1c);

4. The industry-location grid (the SIC×Geo cell definition) is constant.



(a) Employment (b) Establishment Size (c) Establishment to Firm Ratio

Figure 1: Demographics of Employment, Establishments and Firms

The insight is that as the population grows for a given location, so does the number of establishments. The firm size is constant, so with a growing employment pool, there must be more establishments in which those employees work. For example, in Manhattan there used to be 4 supermarkets every 10 blocks, now there are 6 every 10 blocks. Before we turn to what this tells us about competition, we look at the effect this has on HHI. To do so, consider the following stylized example laid out in Table 1.

In our economy there are 2 SIC×Geo areas, say coffee shops in the Philadelphia and Boston metro areas. All firms are identical and there are 1,000 of them in each area. The local HHI in both areas is equal to 10. The local market share of each identical firm is 0.1%, squared and times 1,000 gives an HHI of 10. When we take a weighted average over the HHI in both local markets, the aggregate local HHI is 10. Now at the national level, there are 2,000 establishments and suppose for the sake of argument that the establishment to firm ratio is 1. Then the HHI nationwide is 5.

Fast forward to 2020. The population has increased by 50%, and the firm size is still constant. Therefore there are 1,500 establishments in Philadelphia and in Boston, which gives an HHI of 6.7, which is also the aggregate of these two identical local HHI. Now let us assume for the sake of argument that the establishment to firm ratio has gone up to 2. Each firm has 2 establishment, so there are 1,500 firms in the entire economy. Therefore, even though there are 3,000 establishments,

1980

Baseline Economy

	SIC×Geo 1	SIC×Geo 2	Aggregate Local	Aggregate National
	1,000 est	1,000 est	2,000 est	
Local HHI				
$HHI_{SIC \times Geo}$	10	10	10	5

2020

Increase Population; Constant Firm Size; Multi-est Firms

	1,500 est	1,500 est	3,000 est	
Local HHI				
$HHI_{SIC \times Geo}$	6,7	6.7	6.7	6.7

Table 1: Stylized Example of the Mechanical Source of the Dichotomy between National and Local Concentration

only 1,500 can be considered independent competitors. As a result, the national HHI is equal to 6.7. If all two establishments of the same firm are the two different markets, then the local HHI is also 6.7. The national HHI increases while the local HHI decreases. The dichotomy.

This simple example shows that under the 4 premises, we obtain the dichotomy for purely mechanical reasons. The mechanism stems from demographic changes on a fixed definition of what constitutes a SIC×Geo unit. This does not tell us anything about what has happened to competition in the many markets within these units. If competition amongst coffee stores in each market of the unit goes up and we now have 15 stores competing instead of 10, then the rise in population is competition enhancing. That translates in a decline in markups and of the true HHI. Instead, if the number of competing stores per market goes down from 10 to 5, then we see an increase in market power. In both cases, the HHI goes down locally and up nationally.

The problem that this exercise highlights is that it is extremely difficult, if not impossible, to observe the boundaries of a market. As the number of supermarkets goes from 4 to 6 on 10 blocks in Manhattan, does that mean there is more competition? Maybe. We don't know until we identify who competes with whom or if we measure markups directly. Inferring competition from a geographical definition is tricky, because the definition varies with population density. Because it takes 50 miles to go from one Wholefoods to the next in rural New Jersey, and 25 blocks in Manhattan, that does not necessarily mean that the market in Manhattan is more competitive than New Jersey. Firms just compete differently in denser areas. In fact, the evidence using markups instead of concentration measures seems to suggest that market power is higher in denser areas (Anderson et al. (2018))), areas where there are *more* competitors per block! Therefore as population grows, the market definition changes. And with higher population density, New Jersey

starts to look a bit more like Manhattan did 50 years ago.

I come to two conclusions. First, considering the HHI over time for a fixed grid does not inform us about a change in competition. Second, the dichotomy between national and local HHI is mechanical and does not inform us about whether indeed there is a dichotomy between national and local market power.[4]

Simulation in an Atkeson and Burstein (2008) economy. I now reproduce the same mechanical findings in a more realistic economy simulated under demographics that satisfy the 4 premises. In our model economy, we will obtain the dichotomy in national and local HHI, while market power increases both nationally and locally.

The model is based on De Loecker et al. (2018) with market power in the output market and where the input market for labor is competitive. There is no free entry. The production function is linear $Y_{ij} = A_{ij}L_{ij}$, where productivity A_{ij} is drawn from $\log(A_{ij}) \sim \mathcal{N}\left(\mu, \sigma^2\right)$. In each market, there are N firms that compete à la Cournot.[5]

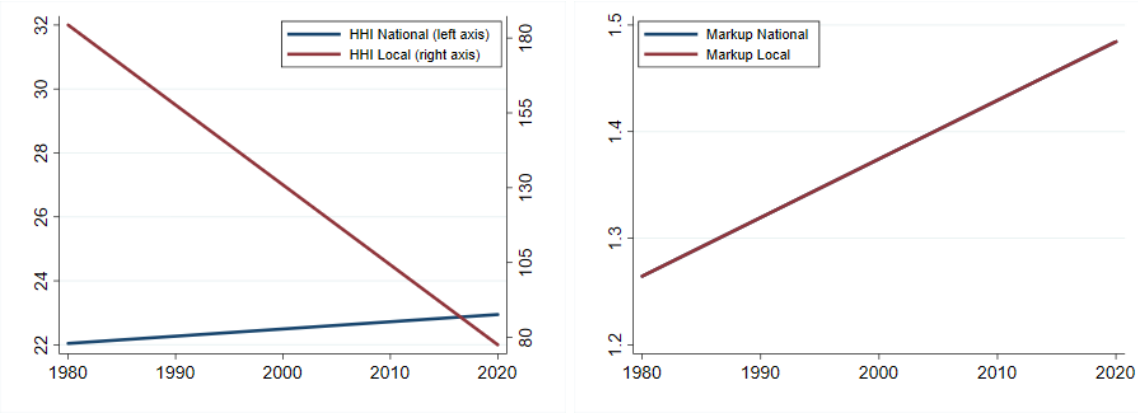
To this setup, we add a distinction between firms and establishments. There are two types of firms; single establishment (SE) firms and multi-establishment (ME) firms. In an attempt to capture the rise of national chains (and superstar firms), I assume that in 1980 the ME firms each have two establishments, while in 2020 the ME firms each have 10 establishments. We adjust for the number of SE firms F_1 and ME firms F_m to ensure that the establishments-to-firms ratio in the economy r is 1.2 in 1980 and 1.3 in 2020 (premise 3).[6] For simplicity, let each of the establishments belonging to a single ME firm be in different locations; let there be 10 SIC×Geo cells in 1980, which remains the same in 2020 (premise 4); let the number of competitors in 1980 be $N = 10$, so there are 100 markets, 10 in each cell. In 1980, the size of the labor force is normalized to 1. For the 2020 economy, the population increases to 1.5 (premise 1) and the number of firms grows to 1,500, which keeps the average firm size constant between 1980 and 2020 (premise 2). In 2020 we consider that there is an increase in market power, where the number of competitors declines to $N = 3$. As a result, there are 500 markets, 50 in each cell.

Figure 2 and Table 2 summarize the results of this thought experiment. In both panels of Figure 2, the straight lines simply connect the two observations for the model economies in 1980 and 2020. Both scenarios generate a divergence in the local and national HHI. This is due to the mechanical

[4]This spurious dichotomy does not only apply to market power in the output market. In the case of market power in the labor market, frictions to mobility between local markets lead to monopsony and hence markdowns on wages. Based on measures of HHI in local labor markets, one would also erroneously conclude that monopsony power has been declining. Instead, Deb et al. (2020) find that wage markdowns have been constant since the 1980s.

[5]We maintain the parameter configuration: within-sector elasticity $\eta = 10$; between-sector elasticity $\theta = 1.5$; Mean of log productivity $\mu = 1$; variance of log productivity $\sigma^2 = 0.2$

[6]Define E and F as the total number of establishments and firms in the economy, where $E/F = r$ is the average Establishment to Firm ratio. Let $N_s F_1$ be the number of single-establishment firms and F_m is the number of multi-establishment firms. Let $E_1 = 1$ and E_m be the number of establishments of the two types of firms. Then $F_1 + F_m = E/r$ and $F_1 + E_m F_m = E$, implying that $F_m = (E - F)/(E_m - 1)$.



(a) HHI National and Local

(b) Markups

Figure 2: HHI and Markups in simulated Atkeson and Burstein (2008) economy

increase in the number of establishments in a fixed grid of SIC×Geo cells. More establishments implies a lower local HHI. Still, the national HHI moves in the opposite direction because multiple establishments of the same firm are counted as one firm. Due to the rise of the establishment to firm ratio, together with how these establishments are distributed over firms, there is an increase in the national HHI.

Table 2 reports the numerical values for these HHIs and markups. The level of the local HHI is notably larger than the national HHI, simply because locally there are fewer firms. Over time, there is a decline in the local HHI from 185 to 78. The national HHI increases from 22 to 23.

	Aggregate HHI		Markup	
	Local	National	Local	National
1980 1,000 est.; $r = 1.2$				
Low Market Power $N = 10$	185	22	1.27	1.27
2020 1,500 est.; $r = 1.3$				
High Market Power $N = 3$	78	23	1.48	1.48

Table 2: HHI for different Atkeson and Burstein (2008) economies. The SIC×Geo grid is fixed at 10 in all economies.

Most striking is that this divergence is completely independent of the change in markups. Aggregate markups increase from 1.27 to 1.48. They are identical for local and aggregate markets. In the Atkeson and Burstein (2008) model of Cournot competition, the markup depends directly on the number of competitors N. And in Cournot, the markup is also related to the HHI, only it is the HHI within a market with $N = 10$ firms instead of the 1,000 establishments in the SIC×Geo unit. That is for 1980; in 2020, the market consists of $N = 3$ and not the 1,500 establishments in the unit.

The 4 Facts Revisited

I now briefly revisit the four main facts in the light of the mechanical relation that exists between national and local concentration.

Fact 1. Diverging trend between national vs local concentration. The divergence of HHI for the fixed SIC×Geo units does not imply there is divergence in market power at the national and local level. In the simulation of the Atkeson and Burstein (2008) economy, market power depends on the number of competitors N within the market, and that can increase or decrease even if the number of firms within a SIC×Geo unit increases.

Fact 2. Pervasive Diverging Trends. The paper finds a significant role for this trend across different sectors, and that trend is very pronounced in the services sector. The paper does a wonderful service drawing the attention to the role of national chains and big box retailers such as Walmart. The development in services shows that the third premise I lined out above – that the ratio of establishments to firms has risen – is most acutely present in the services sector. We expect therefore to find the biggest national vs. local dichotomy in HHI there.

Fact 3. The Role of Top Firms. Large national firms make the mechanical force behind the dichotomy stronger. This also raises the question of reallocation of market share from low markup to high markup, superstar firms. That reallocation is large and accounts for two thirds of the rise in market power (see De Loecker et al. (2020) and Autor et al. (2017)). This also raises the question of the efficiency-increasing effect of reallocation to which I turn below.

Fact 4. When a Top Firm Comes to Town. The paper shows, in the form of case studies, that the entry of large firms in local markets leads to an increase of competition, not a decline. In the light of our 4 premises, as population grows we must see an increase in the number of establishments. Yet at the same time, with the SIC×Geo units constant, there is a decline in the HHI due to an increase in the number of establishments. Some of those entrants will be top firms like Walmart, hence it is no surprise that entry is accompanied by a decline in the local HHI. Equally importantly, the strategy of top firms in which location to open new stores is not random. They will open where the demand is growing fastest, and where as a result, the HHI declines fastest. This is indeed what Holmes (2011) finds: Walmart selectively opens where the demand in its distribution network grows fastest. Houde et al. (2017) find similar results for Amazon's strategy to develop its distribution network of fulfillment centers. This selection will further reenforce the perception that entry of top firms leads to a decline in local HHI, through the mechanical effect of population growth on HHI.

Unobserved Market Structure in Macro

Using an invariant SIC×Geo definition of a market on which to calculate HHI is not an adequate method to measure market power. In macro, the obstacles related to the vast heterogeneity across

sectors and technologies, and the desire to analyze long time series makes it substantially more problematic than in IO. If it does not work for cement and breakfast cereal, it is unlikely that HHI will inform us for the entire macro economy over a long period of time. This then begs the question what we can do in macro to study the evolution of market power.

In the absence of observing who competes with whom, what the boundaries are of the markets, what the preferences and technology are, there are existing methods to measure market power in the macro economy. The demand method of Berry et al. (1995) has been enormously successful in IO, but it is unlikely that we will have the data and the computation power to extend their beyond specifically defined markets such as the market for cars, breakfast cereal, beer and cement.

The production approach building on Hall (1988) – but now applied to firm level data instead of aggregate data – shows that we can obtain reliable estimates at the firm or establishment level for a large set of firms in the economy with limited data requirements (see De Loecker et al. (2020) for the US). This enables us to evaluate the evolution of the distribution market power at different levels of (dis)aggregation and local markets, including the global economy (see De Loecker and Eeckhout (2018)).

But the ambition in macroeconomics goes one step further beyond the mere measurement. We want to perform welfare analysis, do counterfactuals and evaluate the impact of policy interventions. To that effect, I suggest that we approach market structure in the same way we approach Total Factor Productivity (TFP). A scholar in management might enter a BMW factory and literally measure the production function, i.e., how the factory transforms quantities of inputs (materials, labor, management, capital, patents,...) into quantities of output (how many cars roll off the assembly belt every day).

Because of the shortcomings of measurement and data, and because of the huge heterogeneity in production technologies, this method is impossible to measure TFP in the macroeconomy. Instead, as macroeconomists we collect information on aggregate inputs and outputs, and impose a structural model of production (with or without heterogeneity) to infer TFP as the residual. This is the celebrated Solow residual approach to measuring productivity. The information is highly aggregated and by no means as detailed as the microlevel production function the management scholar at BMW estimates, but it does allow us to estimate welfare and counterfactual experiments. And most importantly, it informs us about the evolution of TFP economy wide.

Likewise, even if the IO economist can infer the structure from a narrowly defined market, the macroeconomist has the data nor the tools to do that. So I suggest we treat the market structure as the residual that we estimate through the lens of a model. We observe the quantities of inputs, prices and wages, we observe revenues and profits. Then in a model with oligopolistic markets, we can use those observables – either moments from the aggregate distribution or micro level observations – to match the model generated moments with the moments we observe in the data. We don't observe who competes with whom, but we know that the revenue and markups that we observe in the data

are consistent with the number of competitors, the entry costs that determines the selection of firms that enter, etc.

Matching the aggregate moments of the data on markups and fixed costs,[7] De Loecker et al. (2018) find that the entry costs in 1980 were a lot lower than in 2016, and most importantly, that the number of competitors has decreased from nine in 1980 to three in 2016. The IO economist will, rightly, complain that this approach is too broad brush, just like the management researcher in the BMW factory complains that the TFP measures using the Solow residual lack detail and precision. And I agree. But it is the only alternative we have if we want to make statements regarding market power in the aggregate economy. The benefit of this approach is that we can analyze why markups change, we can do counterfactuals, and we can evaluate policy interventions.

For example, the approach to back out the market structure as the residual allows us to address the major issue that the paper under discussion set out to answer first place: is the rise of dominant, national firms that are highly productive welfare improving? Firms are dominant because they are more productive. The most important implication is that those productive firms can set lower prices and thus obtain a larger share of the market. This leads to the reallocation of revenue share towards high productive firms and is positive for consumers because prices are lower. But those dominant firms also exert market power. The deadweight loss that results from the rise in market power is detrimental for the customer. In addition to the effect of selection of which firms enter and stay in the market, an effect which is ambiguous, we can calculate the overall effect on welfare. In De Loecker et al. (2018) we find that the net effect is negative. The negative effect of the deadweight loss dominates the positive effect from reallocation, while the selection effect is small. Technological change whereby national chains enter local markets to compete and drive down prices is on average anti-competitive.

Conclusion

This paper draws the attention to an important issue in macroeconomics: the evolution of market power over time and across the entire economy. The macroeconomics dimension of market power is as important as the detailed microeconomic and market-specific aspects that inform policy, such as merger review. Instead, economy-wide changes in market power have general equilibrium effects on the labor market, on wages and on wage inequality, as well as on all other realms of the economy. The paper deserves all the credit for putting this issue in the spotlight.

Unfortunately the paper does not deliver answering the question whether there is indeed divergence in national versus local market power, as opposed to concentration. Nor does it answer the question whether dominant national chains are welfare improving. I show that HHI measures are not adequate tools to study market power in the macro economy. In particular, there is a mechan-

[7] See also Deb et al. (2020) and Eeckhout et al. (2020) for estimation of the market structure using micro data.

ical relation between HHI and demographic change. The nature of the macro economy poses even bigger challenges than those already faced by IO. Based on solid grounds, the IO literature has resolutely decided to dispense with HHI measures. In macro we cannot ignore 30 years of research progress in IO, especially because the macro difficulties are even bigger than those in IO.

I propose that to study market power in the macro economy, we instead rely on a firm-level measure of markups and profits, rather than concentration measures. And in order to measure the market structure we need to give up on the detailed description of markets that micro studies can measure. Instead, I propose that we treat the market structure in the same way we treat TFP. We back out TFP as a Solow residual in the context of a model, and in the same manner, I suggest we back out the market structure (the number of competitors, entry costs,...) using firm level data for the macro economy.

All the same, the thought-provoking findings in this paper have been instrumental in stimulating research into the macroeconomics of market power. I am optimistic that other work will take on the challenges in this paper and further our understanding of this important issue.

References

Anderson, E., S. Rebelo, and A. Wong (2018): "Markups across space and time," Tech. rep., National Bureau of Economic Research.

Atkeson, A. and A. Burstein (2008): "Pricing-to-market, trade costs, and international relative prices," *American Economic Review*, 98, 1998–2031.

Autor, D., D. Dorn, L. F. Katz, C. Patterson, and J. Van Reenen (2017): "The Fall of the Labor Share and the Rise of Superstar Firms," Tech. rep., Centre for Economic Performance, LSE.

Berry, S., J. Levinsohn, and A. Pakes (1995): "Automobile prices in market equilibrium," *Econometrica*, 841–890.

Bresnahan, T. F. (1989): "Empirical studies of industries with market power," *Handbook of industrial organization*, 2, 1011–1057.

Cournot, A. A. (1838): *Researches into the Mathematical Principles of the Theory of Wealth*, Macmillan.

De Loecker, J. and J. Eeckhout (2018): "Global Market Power," NBER working paper.

De Loecker, J., J. Eeckhout, and S. Mongey (2018): "Quantifying Market Power," Mimeo.

De Loecker, J., J. Eeckhout, and G. Unger (2020): "The Rise of Market Power and the Macroeconomic Implications," *Quarterly Journal of Economics*, 135, 561–644.

De Loecker, J. and F. M. P. Warzynski (2012): "Markups and Firm-level Export Status," *American Economic Review*, 102, 2437–2471.

Deb, S., J. Eeckhout, and L. Warren (2020): "The Macroeconomics of Market Power and Monopsony," UPF mimeo.

Eeckhout, J., A. Patel, and L. Warren (2020): "The Contribution of Market Power to Wage Inequality," UPF mimeo.

Hall, R. (1988): "The Relation between Price and Marginal Cost in U.S. Industry," *Journal of Political Economy*, 96, 921–947.

Holmes, T. J. (2011): "The diffusion of Wal-Mart and economies of density," *Econometrica*, 79, 253–302.

Houde, J.-F., P. Newberry, and K. Seim (2017): "Economies of density in e-commerce: A study of amazon's fulfillment center network," Tech. rep., National Bureau of Economic Research.

Melitz, M. (2003): "The impact of trade on aggregate industry productivity and intra-industry reallocations," *Econometrica*, 71, 1695–1725.

Melitz, M. J. and G. I. Ottaviano (2008): "Market size, trade, and productivity," *The review of economic studies*, 75, 295–316.